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Hazardous alcohol consumption among spouses/partners of Service personnel – a systematic review of the literature

Abstract:

Background: Alcohol misuse is particularly high among both the United Kingdom (UK) and United States (US) Armed Forces. As alcohol use among couples is associated, military spouses or partners may therefore be at a higher risk of acquiring hazardous drinking behaviours than people married to other occupational groups.

Method: A literature review using a systematic approach was undertaken in four medical databases, supplemented with hand searches of specialist publications and reference lists. The prevalence of hazardous alcohol consumption among military spouses or partners was estimated and potential socio-demographic and military factors associated with this outcome were identified.

Results: 9 papers met inclusion criteria, of which 8 focused on female spouses or partners only. The limited evidence suggests hazardous alcohol consumption was not a common outcome among spouses or partners. None of the papers statistically compared the prevalence among spouses or partners to estimates from the general population and few reported associations with socio-demographic or military factors. Deployment abroad did not appear to be significantly associated with hazardous consumption, although increasing periods of separation from Service personnel may be associated with increased hazardous consumption among spouses or partners.

Conclusions: Limited evidence was found concerning the prevalence of hazardous alcohol consumption among military spouses or partners or which socio-demographic and military factors might be associated with this outcome. There is a dominance of US studies means that applying outcomes to the provision of health services based on other nations must be undertaken with care due to differences in cultural attitudes to alcohol, as well as differences between military structure and operations between the US and other nations.

Key messages:

- The available evidence suggests hazardous alcohol consumption is not commonly found in military spouses or partners
- Few papers had explored associations with socio-demographic or military factors and none had compared the prevalence among military spouses or partners and the general population using statistical methods
- There is a strong need for international studies focusing on alcohol misuse among this population given the reliance on US-based studies

Introduction

Previous research has shown that post-traumatic stress and depression among Service personnel influences the health and well-being of military spouses or partners (1-4). Alcohol misuse is higher among members of the military compared to the general population, with nearly 70% of male UK Service personnel estimated to meet criteria for hazardous drinking (5). This pattern is not limited to the UK, with between 50-84% of US Service active duty personnel meeting criteria for binge-drinking such as greater than five drinks once per week (7, 8).

. Increased alcohol misuse is known to be associated with poorer relationship satisfaction and intimate partner violence (9-12) and is also associated with concordance in drinking behaviours between couple members, where the alcohol use of one person is influenced by the consumption of the other (13-16). Such behaviours may be the result of *socialisation*, where people acquire similar habits from long-term exposure to the behaviours of their partner (17-19). As the effect of this relationships appears to be greater for the female partners of men (14, 20), it is hypothesised that military spouses or partners, who are predominately female, may be at a higher risk of acquiring hazardous drinking behaviours than women in the general population.

To address this hypothesised relationship between Service personnel alcohol misuse and alcohol outcomes among their spouses or partners, a systematic literature review was conducted. The primary aim of this review was to examine the prevalence of hazardous alcohol consumption among the spouses or partners of military personnel. The secondary aim was to examine which socio-demographic and military factors and health outcomes are associated with these outcomes.

Method

Search strategy

A systematic approach was used in this review in line with the PRISMA guidelines (21). The peer-reviewed databases PsychINFO, MEDLINE, PubMed and Web of Science were searched for terms related to “partner” or “spouse”, “military” and “alcohol misuse or use” up to 01 August 2016. No restrictions were placed on the start date of the search. The databases of the specialist journal “Military Medicine” was searched as were the reference lists of included papers. An example of a search strategy is included in Appendix 1.

Inclusion and exclusion criteria

Papers were eligible for inclusion if they were peer-reviewed quantitative studies reporting the prevalence of hazardous alcohol consumption among military spouses or partners. Hazardous alcohol consumption refers to the World Health Organisation definition regarding patterns of alcohol consumption that increases the risk of harm to the user, for example alcohol misuse or binge-drinking (22). For the purposes of this review, hazardous alcohol consumption outcomes included estimates of alcohol misuse, alcohol consumption and binge-drinking. Papers were also included if they examined associations with socio-demographic and military factors with or without prevalence estimates. Comparisons to estimates from the general population were included where reported to quantify the effect of Service life on hazardous alcohol consumption among military spouses or partners. Both validated and non-validated measures of hazardous alcohol consumption were considered and no restrictions on sample size, population or response rates were applied. Papers were excluded if they were qualitative, not peer-reviewed, not in English or did not provide prevalence estimates of hazardous alcohol consumption among military spouses/partners or examine factors associated with this outcome.

Data extraction

Information on author, date of publication and data collection, country, study population, number of participants, response rate and measure of hazardous alcohol consumption were extracted from the included papers by the primary reviewer. Estimates of the prevalence of hazardous alcohol consumption among military spouses or partners, comparisons with general population estimates and socio-demographic or military factors associated with this outcome were recorded. Data extraction of papers subjected to full text review was confirmed by a second reviewer. There was no disagreement between reviewers.

Assessment of papers

The quality of papers in this review were assessed using relevant questions from CASP guidelines (23) for cohort studies and applying them to cross-sectional studies.¹ For each paper, the study aims, design, method of recruitment, sample size, response rate, method of estimating hazardous alcohol consumption, associations with other variables and generalisability of the findings to the wider population of military spouses or partners were critiqued according to the guideline questions. The limitations of the papers, both individually as well as a whole, are discussed in the results.

Results

A total of 459 papers were retrieved (Figure 1); 147 duplicates and 284 papers that were not relevant to the aims of the review were excluded after initial assessment. A total of 28 papers were selected for full text review, of which 9 met inclusion criteria (Table 1). Of the papers included in this review, 6 provided estimates of the prevalence of hazardous alcohol con-

sumption among military spouses/partners and 6 examined associations with socio-demographic or military factors; 3 papers reported both.

FIGURE 1 HERE

Estimates of the prevalence of hazardous alcohol consumption among military spouses or partners

Six papers provided estimates of the prevalence of hazardous alcohol consumption among military spouses/partners (Table 1), ranging from estimates of alcohol misuse, alcohol abuse/dependence and binge-drinking. Among spouses or partners of currently serving personnel, 3.0-10.7% met criteria for alcohol misuse using a cut-off of AUDIT score ≥ 8 (24-27), the current gold standard for measuring alcohol misuse (28) and an estimated 12.4% met criteria for occasional or regular binge-drinking (≥ 5 alcoholic drinks on one occasion) (29). Among the veteran community, 2% of spouses/partners of retired military personnel met criteria for heavy drinking according to self-reported monthly or daily consumption (30) and 6% met criteria for alcohol abuse or lifetime alcohol dependence (31). Only one study included male spouses or partners (27). Differences in alcohol misuse by gender were not reported.

TABLE 1 HERE

As none of the papers statistically compared hazardous alcohol consumption among military spouses or partners to that among women in the general population, there was no evidence to suggest an increased or decreased prevalence of hazardous alcohol consumption among this population. Some papers did contrast their findings to civilian estimates. Padden, et al. stated that the prevalence of binge-drinking among current US military spouses/partners (12.4%)

was comparable that among women in the general US population (12.1%) (29) and while Blow, et al. stated that the prevalence of alcohol misuse among current military spouses or partners was slightly higher compared with women from general population studies (10.7% vs. 8.4%) (25), the authors suggest this may be an artefact of the timing of the survey (the three months following the return of Service personnel from deployment) rather than an actual increase in misuse. Self-reported heavy alcohol consumption among spouses or partners of veterans (2%) was reported to be lower than among women of the same age group in the general population (9%) (30), suggesting this sample may in fact exhibit healthier lifestyle behaviours than the general population.

Sociodemographic and military factors associated with hazardous alcohol consumption among military spouses or partners

Few of the review papers considered the role of socio-demographics in this outcome. One paper examined socio-demographic factors associated with hazardous alcohol consumption among current military spouses/partners (Table 1) and found younger, unmarried spouses/partners of National Guard and those without children had higher rates of alcohol misuse than other spouses/partners in the 3 months following the return of Service personnel from deployment (25). More papers focused on military influences on hazardous alcohol consumption among military spouses/partners. Three papers examined military factors associated with hazardous alcohol consumption among current military spouses/partners (Table 1). Despite the potential stresses of deployment, three papers found no association between Service personnel deployment and alcohol misuse among military spouses/partners (26, 27, 32). However, this may differ depending on when during the deployment cycle surveys are conducted. As previously discussed, the highest AUDIT estimate of 10.7% from Blow et al (25) was obtained from a survey conducted in the 3 months following the return of Service personnel

from deployment when couples may be celebrating their safe return. The length of deployment or separation from personnel also may play a role, with longer deployments of Service personnel significantly associated with negative spouse/partner drinking behaviours; over a 3-year period, 3.1 (95% CI 1.6-4.5) excess diagnoses of alcohol misuse per 1000 women were reported among spouses/partners of Service personnel deployed for longer than 11 months, significantly higher than the spouses/partners of personnel who did not deploy (32). With participants only eligible for this study if Service personnel had served for a minimum of 5 years, and spouse/partner age and number of deployments taken into account, this suggests the excess morbidity from hazardous alcohol consumption among spouses/partners experiencing longer deployments or separations may be due to maladaptive coping with the stresses of extensive separation from Service personnel rather than a lack of adjustment to military life.

The health of Service personnel

Five papers examined how hazardous alcohol consumption among military spouses/partners was influenced by the health outcomes of the Service personnel (Table 1). The positive correlation between the alcohol use of couple members found in the general population was also found among currently serving and veteran military couples (25, 26, 31), although of a small to moderate effect size ($r=0.27-0.48$) (33). Only one study examined drinking concordance among current military couples (25). Blow, et al. reported that AUDIT scores were much higher in Service personnel than military spouses/partners (with an average difference of 7.4); however, both spouses or partners and personnel met AUDIT criteria for alcohol misuse in only 5.4% of couples (25). This suggests, at least in this study population, that positive correlations in alcohol misuse measure scores in military couples may not translate into increased alcohol misuse among military spouses/partners.

Two studies examined hazardous alcohol consumption among spouses/partners in relation to other mental health outcomes of Service personnel. Significantly higher odds of alcohol misuse were reported among current military spouses or partners of Service personnel who met criteria for PTSD, psychological distress or AUDIT (27). However, due to the low numbers of cases among Service personnel, these associations could not be adjusted for potential confounders and may, in part, be related to socio-demographic factors or the mental health of spouses or partners themselves. No significant differences in alcohol misuse were found between spouses/partners of veterans with (6.6%) or without (6.7%) a PTSD diagnosis (34). However, this study over-sampled Vietnam-era veterans with histories of trauma into the study, which may have caused the two samples to be more comparable in terms of stressors associated with alcohol misuse among spouses/partners, masking any true association with veteran PTSD. It is important to note for at least some of spouses/partners involved, they were not in a relationship with personnel during their time of Service and 20% had been in the relationship for 1-6 years. As a result, there may be differential effects from Service personnel PTSD on alcohol misuse by military spouses/partners according to relationship length, such as increasing misuse with increasing exposure, that were not controlled for in this study.

Quality assessment

There are certain limitations to the papers retrieved from the literature search that should be considered when reviewing the quality of the evidence (Table 2). All of the papers are based on mostly small cross-sectional studies with most containing approximately 200-250 participants. Response rates ranged from less than 30% to more than 70%, leading to differences in potential selection biases between studies. Some papers did not report response rates due to either convenience sampling or poor reporting and were therefore not able to examine bias by

non-response. As a result, it is unclear how the findings from such papers, and those with small sample sizes, may reflect the wider population.

Data from US military spouses or partners was used in 8 of the 9 papers. Findings may therefore not be applicable to other countries. All papers bar one focused on female spouses or partners only, while the Australian study included male spouses or partners (27). In this study, gender was controlled for in analyses but not in relation to alcohol misuse, potentially confounding the estimates of prevalence and association with other factors reported in this study. Most papers focussed on military spouses or partners affiliated with National Guard or active duty Army personnel, however study populations also included spouses or partners of Vietnam-era veterans and military retirees and those in a committed relationship for a minimum of a year. This heterogeneity among the sample populations of the papers included in this review should be considered in light of the findings, as involvement of different groups of spouses or partners surveyed (for example veterans, currently serving, currently deployed and the inclusion of male spouses or partners) will limit the generalisability of the findings to the wider population.

The method of recruitment should also be considered. While the majority of veterans in the US access health care services through Veteran's Affairs (VA), sampling at VA centres may mean control groups are sicker than community controls as they are attending for other health care needs. Given the benefits to mental health and well-being participants belonging to Family Readiness groups may receive over time, participants recruited via this method may have better mental health than those that do not attend such groups (35). The use of data from participants of these groups may therefore under-estimate the prevalence of hazardous alcohol consumption in this population. Papers that recruited spouses or partners via personnel will

be subject to differential selection of potential respondents in this study, for example by relationship status.

Four papers used AUDIT, the current gold-standard in alcohol misuse screening (36) to provide robust prevalence estimates of hazardous alcohol consumption, with two others using other validated measures or clinical interviews. Estimates provided by non-validated measures are likely to be less accurate. In particular, papers using self-reported alcohol intake only may be subject to responder bias due to concerns about the social acceptability of admitting to using alcohol, underestimating the true prevalence of hazardous consumption (30).

The different concepts being measured by some of the tools have implications for the comparability of estimates across papers, with validated measures including a focus on the effects of alcohol while others estimated alcohol consumption. While the use of ICD-10 codes from medical records does provide access to a large amount of data, the prevalence and rates estimates should also be treated with care as they are based on those accessing treatment via military healthcare service only and assume accurate coding. This paper is also unlikely to represent spouses/partners who choose not to access services within the military health care system.

Discussion

The evidence regarding the prevalence of hazardous alcohol consumption among military spouses or partners, while limited, suggests hazardous alcohol consumption is not a common outcome among this population. With no comparisons using statistical methods to general population estimates, it is not possible to determine what effect exposure to military life may have on this outcome. Male military spouses or partners were included in only one study but

differences in their outcomes compared to those of female spouses/partners were not reported.

Due to the limited number of papers and the small size and heterogeneity of the study populations, there was conflicting evidence of associations between hazardous alcohol consumption and socio-demographic factors. Those that were found suggest hazardous consumption among military spouses or partners is related to similar factors as in women in the general population, decreasing with spouse or partner age, marital status and the presence of children. Much of the focus on military factors centred on the effect of deployment but, again, there was no evidence regarding an association. While differences in the timing of measurement across the deployment cycle may have masked this association, it may also be related to prior research that suggested US military spouses or partners prefer to employ positive, resilient coping behaviours such as keeping busy or positive thinking in stressful situations rather than turning to alcohol or other harmful behaviours (37-39). However, such coping mechanisms may be harmful for health and well-being in the long-term as shown by the increasing number of cases of alcohol misuse among spouses or partners separated from Service personnel on deployments of 11 months or longer (32). Whatever the mechanism, these cases represent a substantial burden on health care services and the ability of military families to cope during long periods of family separation. There was also mixed evidence regarding the impact of Service personnel mental health outcomes on hazardous consumption among military spouses or partners despite the interest in the impact of PTSD on family functioning. As with general population research, alcohol use is correlated between military couples, although this correlation does not necessarily translate into an increase in alcohol misuse among military spouses partners given the low number of concordant couples found in one study. (25). While

this study was only conducted over a short period of time, it suggests the original hypothesis of this review is not supported by current research.

Of particular note is the dominance of US based research. Cultural differences in alcohol use means consumption is lower in the US general population than other countries (40). With levels of consumption among military spouses or partners likely to reflect the underlying societal norms, prevalence estimates in other nations may be higher than those included within this review. Similarly, social and military factors associated with hazardous alcohol consumption may not be as influential for spouses or partners in other countries, particularly given the differences in military structure and length of operations. It is important that research is undertaken in other countries to understand hazardous consumption among military spouses or partners and identify which factors are relevant in particular contexts.

Limitations

Inter-rater reliability checks were not used as there was no difference in the papers included in or excluded from the review by the primary and second reviewers. The data extracted from the papers by the second reviewer was checked against that already extracted by the primary reviewer and additions made where necessary. The use of standardised questions from CASP guidelines in the critical appraisal process limits the potential for bias in the critique of the studies.

Further research

Given the current lack of evidence in this area, evidence relating to hazardous alcohol consumption among spouses or partners of both current and veteran personnel was included in this review. Future research should aim to provide robust prevalence estimates of hazardous

alcohol consumption among comparable populations of military spouses or partners and examine associations with socio-demographic and military factors and to examine outcomes among male spouses/partners. As the drivers of alcohol misuse are likely to differ among serving and ex-serving members of the military, further research should attempt to explore these in relation to the outcomes of spouses/partners. Longitudinal studies of military couples may help clarify the concordant nature of hazardous alcohol consumption, as well as the role the physical or mental health of Service personnel plays in this outcome. Such studies should also consider the health of spouses or partners as excluding this may over-estimate the influence of Service life or personnel outcomes on military spouses or partners.

Conclusions

Despite wide-spread alcohol misuse among military personnel, there is limited evidence concerning hazardous alcohol consumption among military spouses or partners. Based upon the available evidence, hazardous alcohol consumption does not appear to be a common mental health outcome among military spouses or partners. Few papers examined which socio-demographic or military factors were associated with hazardous consumption or the role that the health of Service personnel or military spouses or partners themselves might play. While deployment status itself did not appear to be significantly associated with alcohol misuse, longer periods of deployment may be associated with increased misuse by military spouses or partners. The dominance of US studies is concerning for both the provision of services and evidence-based policy for military spouses or partners and families in other countries due to differences in cultural attitudes to alcohol, as well as differences between military structure and operations between the US and other nations.

Table 1: Papers included in review

Current military spouses/partners										
Authors	Date	Country	Population	Date of data collection	Recruitment	N	Response rate	Alcohol use measure	Prevalence of alcohol misuse	Factors associated with alcohol misuse
Mansfield, Kaufman et al	2010	US	S/Ps of active-duty Army personnel	2003-2006	Electronic medical records for outpatient visits under TRICARE	250,626	N/A	ICD-9 diagnosis of alcohol misuse	-	<p><i>Deployment</i></p> <p>1.1% S/Ps of deployed personnel and 0.8% of S/Ps of non-deployed personnel had ICD-9 diagnosis for alcohol use (abuse and dependence) in military health service records</p> <p>3.1 (95% CI (1.6-4.5) excesses case of alcohol misuse per 1000 in of personnel deployed for >11 months, 1-11 months 1.1 (95% CI (0.0-2.2) excess cases</p>

Padden, Connors et al	2011	US	S/P of active-duty Army personnel	2005	Recruited from Family Readiness Groups on large US Army base	105	-	Multidimensional Health behaviour Inventory (MHBI) (binge-drinking)	75.2% never drank ≥ 5 alcoholic beverages in a session, 12.4% rarely, 10.5% sometimes, 1.9% often	-
Gorman, Blow et al	2011	US	S/Ps in committed romantic relationship with National Guard personnel	2007-2008	Recruited during mandatory reintegration workshops following return from deployment (45-90 days)	212	36%	AUDIT (score ≥ 8)	3% S/Ps met criteria for hazardous alcohol use	-

Erbes, Meis et al	2012	US	S/Ps of National Guard per- sonnel	-	Nominated by personnel completing survey prior to deploying	216	26% per- sonnel, 77% nominat- ed S/Ps	AUDIT (score 8-15 “risky drink- ing behav- iour, 16+ “harmful”)	3.2% S/Ps met criteria for hazard- ous use, 0.5% harm- ful use	<p><i>Deployment</i></p> <p>3% S/Ps with no prior deployment experience met criteria for hazardous use, 1% for harmful use; 4% S/Ps with no prior deployment experi- ence met criteria for hazardous use, 0% for harmful use</p> <p><i>Personnel mental health</i></p> <p>Alcohol misuse between National Guard cou- ples positively correlated ($r=0.368$, $p<0.001$)</p>
McGuire, Runge et al	2012	Australia	S/Ps of Australian Defence Force (tri- Service) – includes approx. 20% male	2011- 2012	Recruited through Ser- vice person- nel	697	38%	AUDIT cat- egories ≥ 8 - 15, ≥ 16	-	<p><i>Deployment</i></p> <p>9.8% S/Ps of deployed personnel met criteria for hazardous drinking (AUDIT score 8-15) and 2.5% for harmful drinking (AUDIT score ≥ 16), compared with 8.9% S/Ps and 0.4% of non- deployed personnel respectively. Difference not statistically significant</p>

			S/Ps							<p><i>Personnel mental health</i></p> <p>Personnel alcohol misuse (AUDIT ≥ 16) associated with alcohol misuse among S/Ps (AUDIT ≥ 16) (OR=13.99 (95% CI 4.12, 47.49, $p < 0.001$ (n S/Ps=11))</p> <p>Psychological distress in personnel (K10) associated with alcohol misuse among S/Ps (AUDIT ≥ 16) (K10 16-29 OR=6.73 (95% CI= 1.39, 32.63) $p=0.02$ (n S/Ps=7), (K10 30-50 OR=9.98 (95% CI=1.38-72.31) $p=0.02$, (n S/Ps=2))</p> <p>Symptoms of PTSD in personnel (PCL-C) associated with alcohol misuse among S/Ps (AUDIT ≥ 16) (PCL-C 30-49 OR=3.83 (95% CI=0.77-19.14), $p=0.10$ (n S/Ps=3), PCL-C50-85 OR=12.96 (95% CI=2.84-59.26), $p=0.001$, (n S/Ps=4)</p>
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Blow, Gorman et al	2013	US	S/Ps in committed romantic relation- ship with National Guard per- sonnel	2007- 2009	Recruited during man- datory rein- tegration workshops following return from deployment (45-90 days)	674	1 st wave 35.9% 2 nd wave 71.4%	AUDIT (score ≥8)	10.7% S/Ps met criteria for hazard- ous use	<p><i>Sociodemographic factors</i></p> <p>S/Ps who were younger, not married and with- out children more likely to meet criteria for alcohol misuse</p> <p><i>Personnel mental health</i></p> <p>AUDIT scores of S/Ps and personnel positively correlated (r=0.27, p<0.01)</p> <p>68.4% of couples non-hazardous concordant alcohol misuse (neither met criteria), 26.2% discrepant (one met criteria) and 5.4% con- cordant for misuse (both met criteria)</p> <p>Personnel AUDIT score not associated with reduced relationship satisfaction in either part- ner</p>
Spouses/partners of veterans										

Authors	Date of publica- tion	Coun- try	Population	Date of data col- lection	Re- cruit- ment	N	Re- sponse rate	Alcohol use measure	Prevalence of alcohol misuse	Factors associated with alcohol misuse
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Jordan, Marmar et al	1992	US	S/Ps living with veter- ans serving during Vietnam era	-	S/Ps of partici- pants in the Na- tional Survey of the Vietnam Genera- tion recruit- ed ac- cording to vet- eran PTSD case- ness	376 - 122 with PTSD	80%	Brief MAST score ≥ 6 “Probable alcoholic”	-	<i>Personnel mental health</i> S/Ps of veterans without PTSD=6.7%, S/Ps of veterans with PTSD=6.6%
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Had- dock, Poston et al	1995	US	S/Ps of retired military personnel	-	Recruit- ed from ongoing wellness study at military centre	983	-	Alcohol con- sumption index derived from self- reported es- timated beer, wine & liquor consump- tion/month	2% S/Ps classed as heavy drinkers (60+ drinks per month or 2 drinks/day)	-
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Miller, Reardon et al	2013	US	S/Ps of veterans with PTSD diagnosis attending Veteran Affairs (VA) med- ical centres who had been in relation- ship for 12 months or more	-	Recruit- ed via flyers, mailings and re- ferrals from VA centres	242	-	Structured Clinical In- terview for DSM-IV (SCID-IV)	6% S/Ps re- ported symp- toms of alcohol abuse	<i>Personnel mental health</i> Veteran and S/Ps alcohol abuse positively cor- related (r=0.48, p=0.01)
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S/Ps=spouses/partners, ICD-9=International Statistical Classification of Diseases and Related Health Problems, VA=Veteran Affairs

Table 2: Quality assessment of review papers

Current military spouses/partners			
Authors	Date	Study design	Quality assessment
Mansfield, Kaufman et al	2010	Cross-sectional	<ul style="list-style-type: none"> • Cross-sectional study – causality? • Response rate not applicable as medical records used • High N • S/Ps of active-duty Army personnel who had served for minimum 5 years, S/P age, number of deployments and prior mental health considered - ?representative of wider population • Validity of ICD codes - ?differences in coding between medical centres • Date of data collection stated • Use of medical records - ?help-seeking population, representative of wider population • Estimated prevalence, rates and associated factors – previous mental health of S/Ps considered in analyses

Padden, Connors et al	2011	Cross-sectional	<ul style="list-style-type: none"> • Cross-sectional study – causality? • Response not stated – cannot determine bias • Low N • S/Ps of active-duty Army personnel recruited from Family Readiness Groups - ?representative of wider population • Validated measure of binge drinking • Date of data collection stated • Estimated prevalence only
Gorman, Blow et al	2011	Cross-sectional	<ul style="list-style-type: none"> • Cross-sectional study – causality? • Low response – <40% – selection bias? • Low N • S/Ps of National Guard recruited from mandatory reintegration workshops - ?representative of wider population • - AUDIT • Date of data collection stated • Estimated prevalence only

Erbes, Meis et al	2012	Cross-sectional	<ul style="list-style-type: none"> • Cross-sectional study – causality? • Low response from personnel – <30% –selection bias? • Low N • S/Ps of National Guard recruited via postal survey 1 month prior to deployment - ?explanation for low responses, representative of wider population • – AUDIT • Date of data collection not stated • Estimated prevalence and associated factors
McGuire, Runge et al	2012	Cross-sectional	<ul style="list-style-type: none"> • Cross-sectional study – causality? • Low response – <40% • Medium sized study population • Recruited through Service personnel, range of S/P groups participated, including male spouses/partners and partners of veterans - ?differences in groups not always reported • – AUDIT • Date of data collection stated • Estimated prevalence and associated factors - associations with personnel mental health not examined for associations/controlled for potential confounders due to low N

Blow, Gorman et al	2013	Cross-sectional	<ul style="list-style-type: none"> • Cross-sectional study – causality? • Low response at phase 1, high response at phase 2 • S/Ps of National Guard recruited during mandatory reintegration workshops following return from deployment (45-90 days) - ?representative of wider population • - AUDIT • Estimated prevalence and associated factors
Spouses/partners of veterans			
Authors	Date	Study design	Quality assessment
Jordan, Marmar et al	1992	Cross-sectional	<ul style="list-style-type: none"> • study – causality? • • Low N • Recruited via National survey of veterans, oversampled veterans with history of trauma in control groups - ?differences in participation in different veteran groups, representative of wider military population • of alcohol misuse • Date of data collection not stated • Estimated prevalence and associated factors

Haddock, Poston et al	1995	Cross-sectional	<ul style="list-style-type: none"> • study – causality? • • Large N • Recruitment not described, cannot determined sampling - poor quality study • – poor measure of misuse • Date of data collection not stated
Miller, Reardon et al	2013	Cross-sectional	<ul style="list-style-type: none"> • Cross-sectional study – causality? • Convenience sampling, response not stated – may be selection • bias • Low N • Recruited via VA medical centres – ?likely to be representative of wider population given that PTSD care delivered through VA • Validated measure for alcohol misuse • Estimated prevalence and associated factors

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Appendix 1

Search strategy for PsycINFO:

1. (wives or wife or spouse or intimate partner* or cohabitating partner* or couples).mp.
or exp Wives/ or exp Spouses/ or exp couples/ [mp=title, abstract, heading word, table
of contents, key concepts, original title, tests & measures]
2. (military personnel or military families or veterans or air force or army or coast guard
or national guard or navy personnel).mp. or exp military personnel/ or exp air force
personnel/ or exp army personnel/ or exp coast guard personnel/ or exp commissioned
officers/ or exp enlisted military personnel/ or exp marine personnel/ or exp military
medical personnel/ or exp national guard personnel/ or exp navy personnel/ or exp
volunteer military personnel/ or exp military veterans/ or exp military families/
[mp=title, abstract, heading word, table of contents, key concepts, original title, tests
& measures]
3. 1 and 2
4. (alcoholism or alcohol problem* or alcohol drinking or alcohol dependence or haz-
ardous alcohol or alcohol abuse or drinking behavior or alcohol consumption or
binge drinking or alcohol misuse).mp. or exp alcoholism/ or exp alcohol drinking pat-
terns/ or exp drinking behavior/[mp=title, abstract, heading word, table of contents,
key concepts, original title, tests & measures]
5. 3 and 4